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LAB8

WAP Implement Single Link List with following operations a) Sort the linked list.

b) Reverse the linked list.

c) Concatenation of two linked lists

d) implement Stack & Queues using Linked Representation

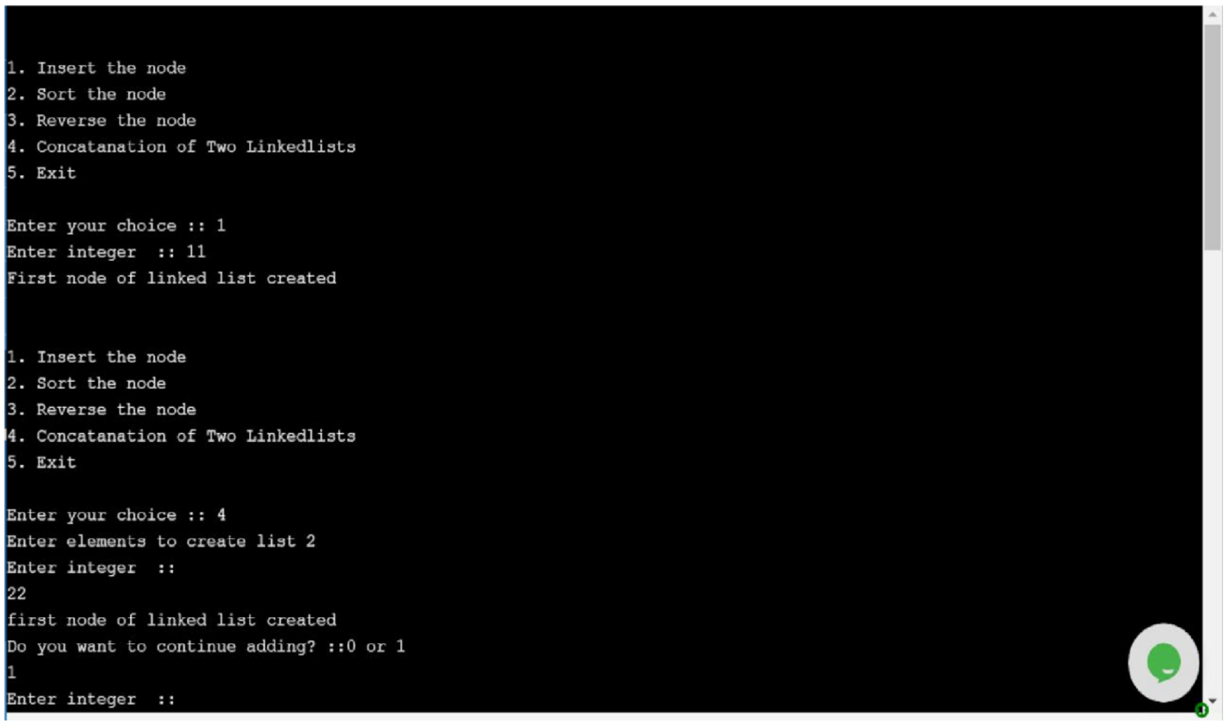
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h> struct
node
{     int sem;
struct node *next;
};
struct node *head= NULL;
struct node *head2= NULL;
int c=0; void Insert()
{
            struct node *newnode;
            struct node *temp;
   int s;     printf("Enter
integer  :: ");
scanf("%d",&s);
   newnode=(struct node*)malloc(sizeof(struct node));
newnode->sem =s;     if (head==NULL)
   {
     newnode->next=NULL;
head=newnode;       printf("First node of
linked list created\n");       c++;
   }
else
    {
                        temp=head;
       while(temp->next!=NULL)
       {
                                    temp=temp->next;
       }
                        temp->next=newnode;
                        newnode->next=NULL;
                        c++; printf("Node
                        created\n");
             }
}
void Insert2()
{
            struct node *newnode;
            struct node *temp;
    int s,y;     printf("Enter elements to
create list 2\n");     do
    {
    printf("Enter integer  :: \n");     scanf("%d",&s);
newnode=(struct node*)malloc(sizeof(struct node));
newnode->sem =s;     if (head2==NULL)
    {
      newnode->next=NULL;
head2=newnode;        printf("first node of
linked list created\n");       c++;
    }
else
     {
                        temp=head2;
while(temp->next!=NULL)
        { temp=temp->next;
        }
                        temp->next=newnode;
                        newnode->next=NULL;
                        c++;
                        printf("Node created\n");
             }
             printf("Do you want to continue adding? ::0 or 1\n");
            scanf("%d",&y);
    }while(y!=0);
}


void bubbleSort()
{
    int swapped, i;      struct
node *ptr1;      struct node
*lptr = NULL;
```

```
    if (head == NULL)
return;        do
    {
        swapped = 0;          ptr1
= head;            while (ptr1-
>next != lptr)
        {
            if (ptr1->sem > ptr1->next->sem)
            {                  int temp = ptr1-
>sem;                  ptr1->sem = ptr1-
>next->sem;                  ptr1->next-
>sem = temp;                  swapped = 1;
            }
            ptr1 = ptr1->next;
        }          lptr
= ptr1;
    }
    while (swapped);
}

void reverse()
{
    struct node* prev = NULL;
struct node* current = head;
struct node* next = NULL;
while (current != NULL) {
next = current->next;
current->next = prev;
prev = current;         current =
next;
    }
    head= prev;
}

void concat()
{         struct node
*ptr;
if(head==NULL)
        {
                head=head2;
        }
        if(head2==NULL)
               {
                        head2=head;
            }
        ptr=head;        while(ptr-
>next!=NULL)                ptr=ptr-
>next;        ptr->next=head2;
}
void display1()
{
            struct node *ptr;
    ptr=head;
int i=1;

    if(ptr==NULL)
    {
        printf("Linked list is empty!\n");
    }
else
            {
        while(ptr!= NULL)
        {
                            printf(" %d",ptr-
                            >sem); i++; ptr=ptr-
                            >next;
        }

    }

}
void display2()
{
            struct node *ptr;
ptr=head2;
    int i=1;

    if(ptr==NULL)
    {
        printf("Linked list is empty!\n");
    }
else
            {
        while(ptr!= NULL)
        {
```

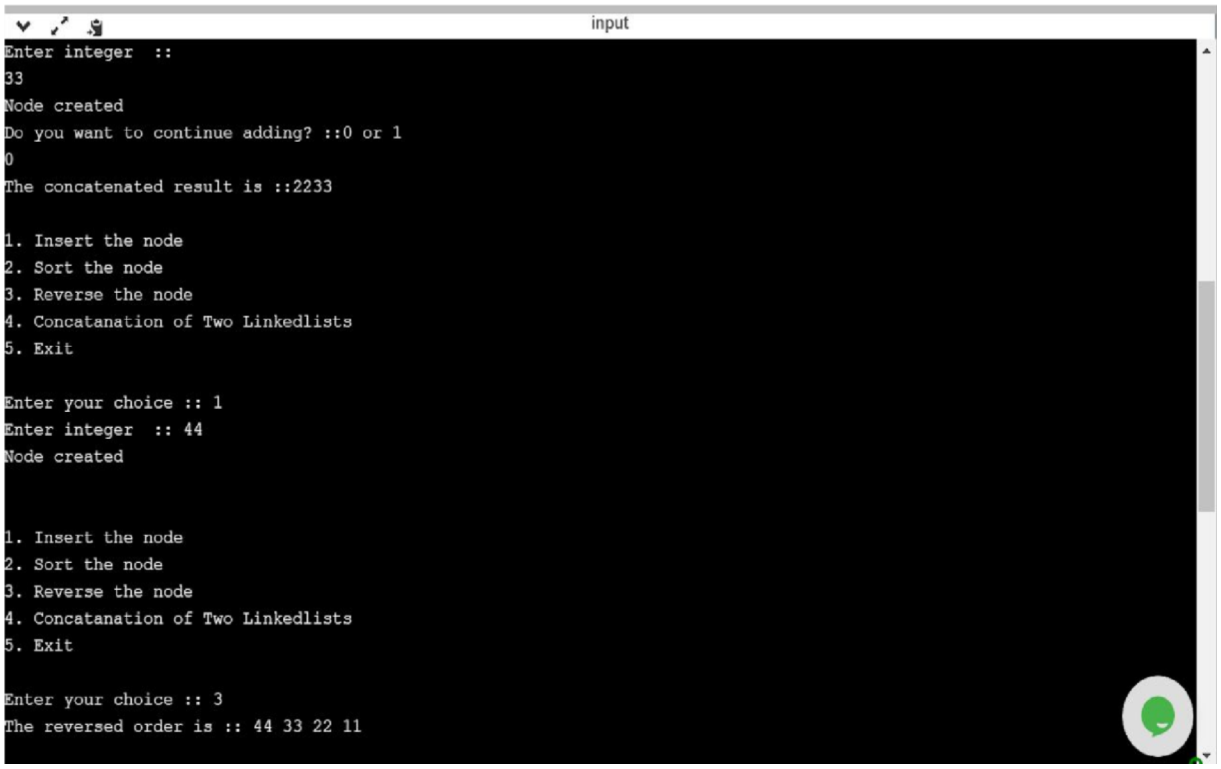
```
                              printf("%d",ptr-
                              >sem); i++; ptr=ptr-
                              >next;
        }

    }

}

int main()
{
    int choice,pos;
do
    {
                        printf("\n\1. Insert the node \n2. Sort the node\n3. Reverse the node\n4.
Concatanation of Two Linkedlists \n5. Exit\n");
                        printf("\nEnter your choice :: ");
                        scanf("%d",&choice);
                        switch(choice)
                        {
                              case 1:
                              Insert();
                              break;

                              case 2:
                              bubbleSort();
                              display1();
                              break;

                              case 3:  reverse(); printf("The
                              reversed order is ::");
                              display1(); break;

                              case 4:      Insert2();     concat();
                        printf("The concatenated result is ::");
                        display2(); break;

                              case 5:
                              break;

                              default: printf("Wrong
                              choice!\n"); break;
                        }
```

```
            }while(choice!=5);
            return 0;
}
```

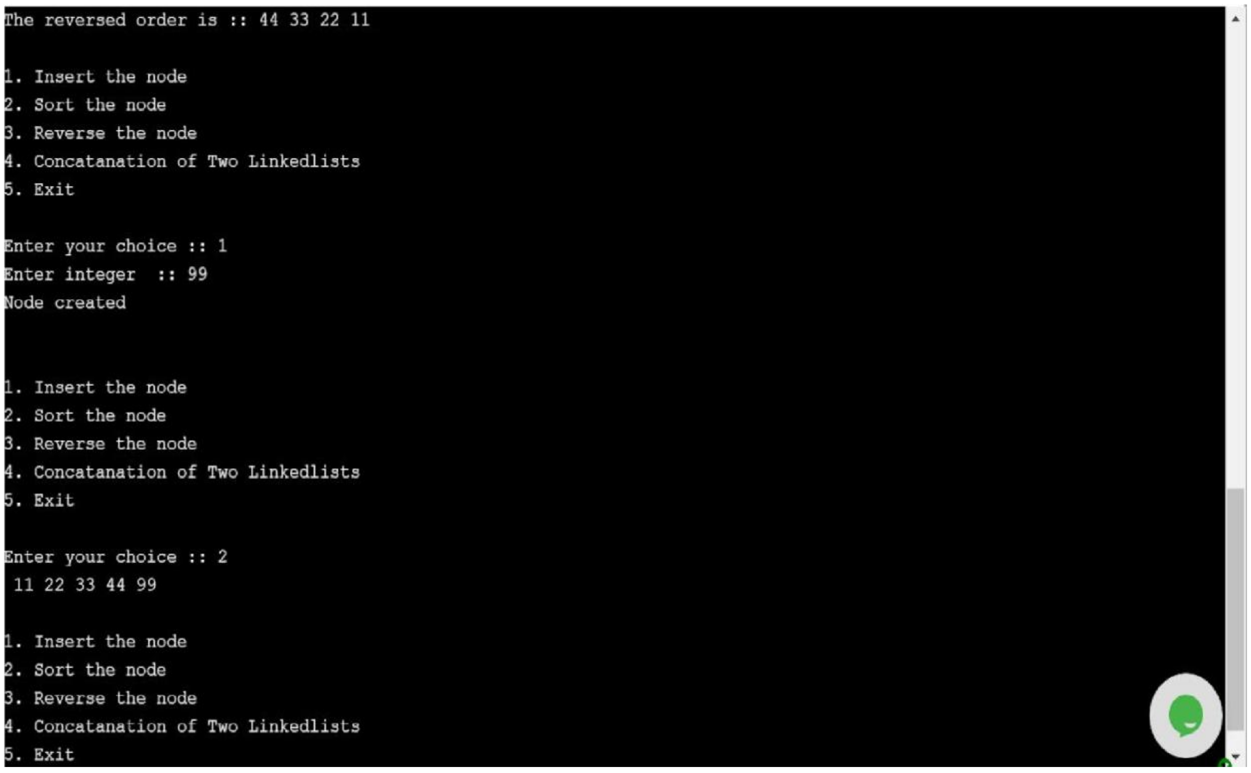
OUTPUT:



```
1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 1
Enter integer  :: 11
First node of linked list created


1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 4
Enter elements to create list 2
Enter integer  ::
22
first node of linked list created
Do you want to continue adding? ::0 or 1
1
Enter integer  ::
```



```
Enter integer  ::
33
Node created
Do you want to continue adding? ::0 or 1
0
The concatenated result is ::2233

1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 1
Enter integer  :: 44
Node created


1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 3
The reversed order is :: 44 33 22 11
```



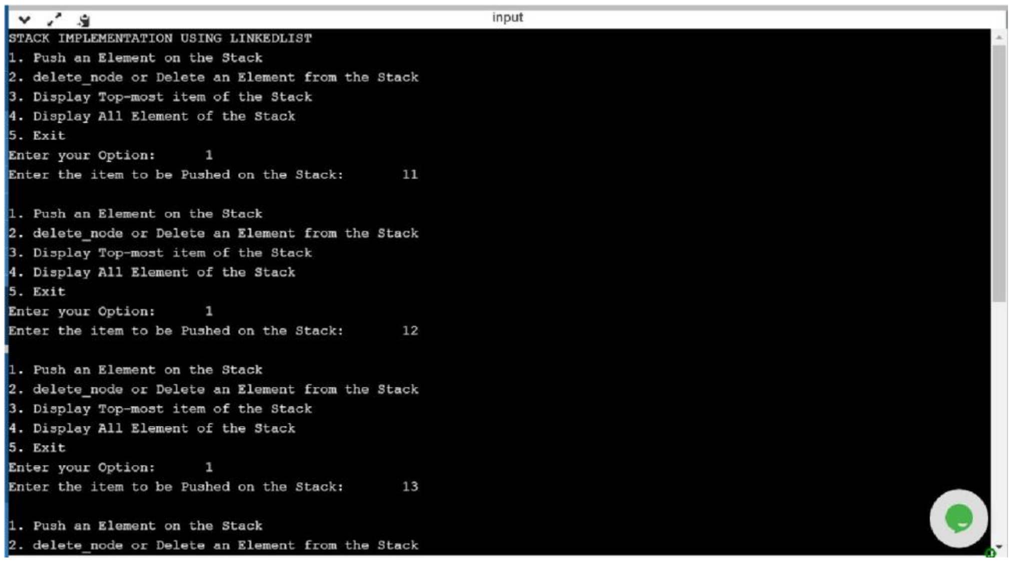
```
The reversed order is :: 44 33 22 11

1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 1
Enter integer  :: 99
Node created


1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit

Enter your choice :: 2
 11 22 33 44 99

1. Insert the node
2. Sort the node
3. Reverse the node
4. Concatanation of Two Linkedlists
5. Exit
```

PART D
i)

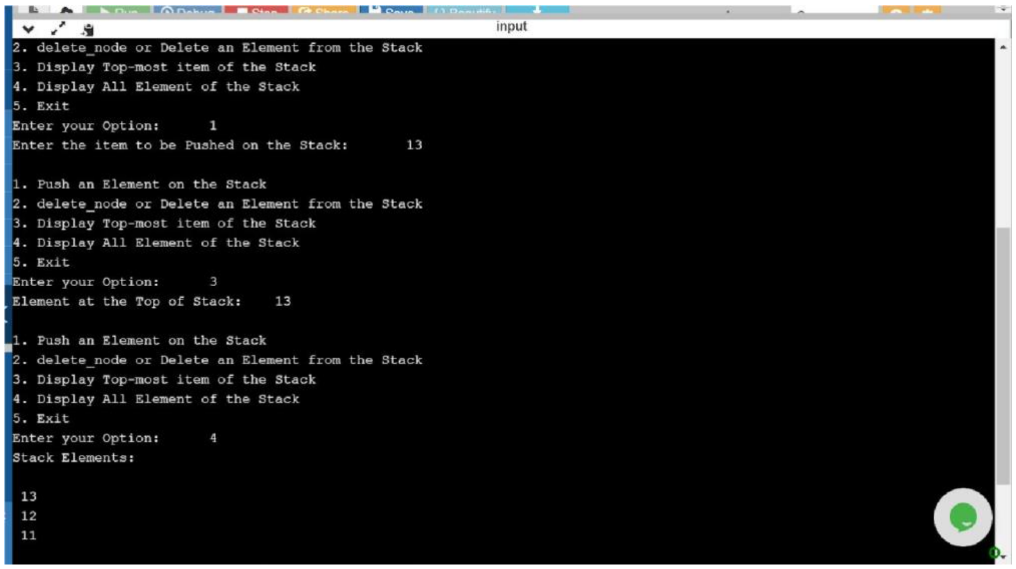
```
#include<stdio.h>
#include<stdlib.h>

struct node
{       int data;
struct node *link;
}*top = NULL;

int isEmpty()
{
      if(top == NULL)
      {
return 1;       }
else
      {
return 0;
      }
}

void push(int item)
{
      struct node *temp;       temp = (struct node
*)malloc(sizeof(struct node));       if(temp == NULL)
      {             printf("Stack is
Full\n");             return;
      }
      temp->data = item;
temp->link = top;       top
= temp;
}

int delete_node()
{
      struct node *temp;
int item;       if(isEmpty())
      {
            printf("Stack is Empty\n");
            exit(1);
      }
      temp = top;
item = temp->data;
top = top->link;
```

```
free(temp);      return
item;
}

void display()
{
    struct node *ptr;
if(isEmpty())
    {
        printf("Stack is Empty\n");
return;
    }
    printf("Stack Elements:\n\n");      for(ptr
= top; ptr != NULL; ptr = ptr->link)
    {
        printf(" %d\n", ptr->data);
    }
printf("\n");
}

int peek()
{
    if(isEmpty())
    {
        printf("Stack is Empty\n");
exit(1);
    }
    return top->data;
}

int main()
{
   printf("STACK IMPLEMENTATION USING LINKEDLIST");
    int option, element;
while(1)
    {              printf("\1. Push an Element on the Stack\n");
printf("2. delete_node or Delete an Element from the Stack\n");
printf("3. Display Top-most item of the Stack\n");
        printf("4. Display All Element of the Stack\n");
printf("5. Exit\n");          printf("Enter your
Option:\t");          scanf("%d", &option);
switch(option)
        {
case 1:
```

```
                        printf("Enter the item to be Pushed on the Stack:\t");
scanf("%d", &element);                          push(element);
break;                     case 2:
                        element = delete_node();
printf("Deleted Element:\t%d\n", element);
break;                     case 3:
                        printf("Element at the Top of Stack:\t%d\n", peek());
break;                     case 4:
                        display();
break;                     case 5:
                        exit(1);
default:
                        printf("Wrong Option Selected\n");
            }
      }
return 0;
}
```



```
STACK IMPLEMENTATION USING LINKEDLIST
1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      1
Enter the item to be Pushed on the Stack:       11

1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      1
Enter the item to be Pushed on the Stack:       12

1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      1
Enter the item to be Pushed on the Stack:       13

1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
```

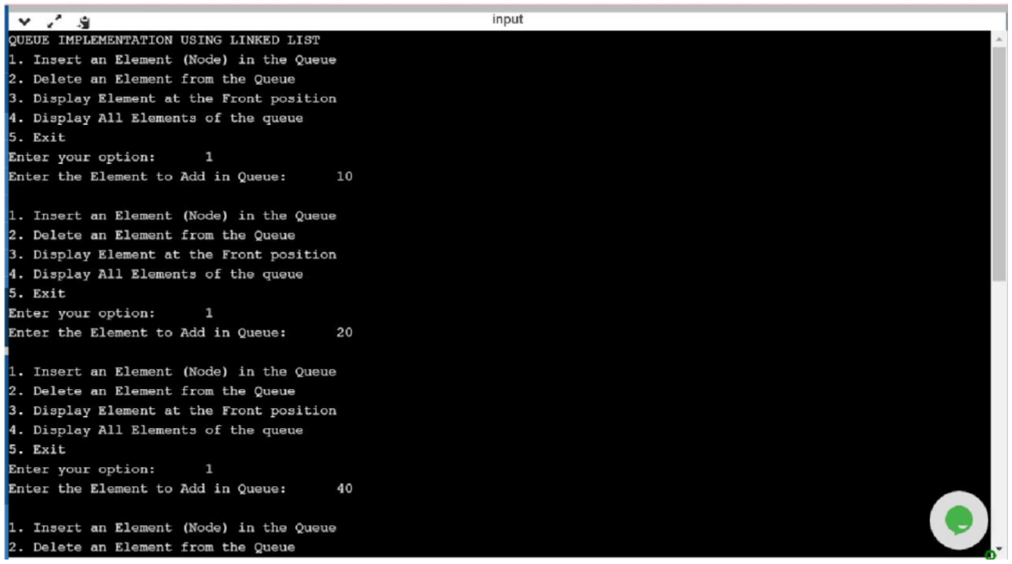


```
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      1
Enter the item to be Pushed on the Stack:       13

1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      3
Element at the Top of Stack:    13

1. Push an Element on the Stack
2. delete_node or Delete an Element from the Stack
3. Display Top-most item of the Stack
4. Display All Element of the Stack
5. Exit
Enter your Option:      4
Stack Elements:

 13
 12
 11
```

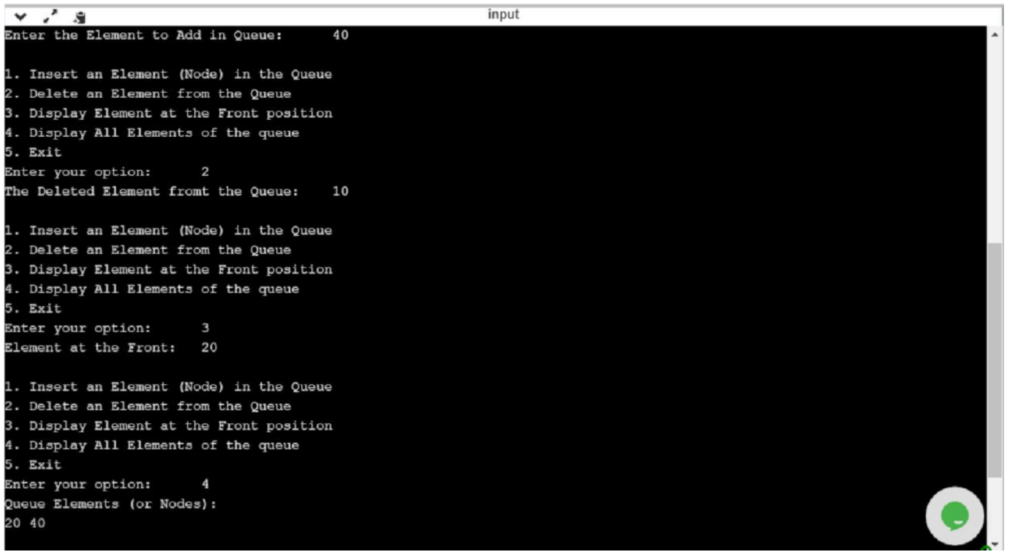
iI)

```
#include<stdio.h>
#include<stdlib.h>

struct node
{       int data;
struct node *link;
}*front = NULL, *rear = NULL;

int isEmpty()
{
    if(front == NULL)
    {
return 1;
    }
else
    {
        return 0;
    }
}

void insert(int item)
{
    struct node *temp;      temp = (struct node
*)malloc(sizeof(struct node));      if(temp == NULL)
    {
        printf("Queue is not Allocated\n");
return;
```

```
      }
      temp->data = item;
temp->link = NULL;       if(front
== NULL)
      {             front =
temp;
      }
else
      {
            rear->link = temp;
      }
      rear = temp;
}

int delete_node()
{
      struct node *temp;
int item;       if(isEmpty())
      {
            printf("Queue is Empty\n");
exit(1);
      }
      temp = front;
item = temp->data;
front = front->link;
free(temp);       return
item;
}

int peek()
{
if(isEmpty())
      {
            printf("Queue is Empty\n");
exit(1);
      }
      return front->data;
}

void display()
{       struct node
*ptr;
if(isEmpty())
      {
            printf("Queue is Empty\n");
return;
      }
      printf("Queue Elements (or Nodes):\n");
for(ptr = front; ptr != NULL; ptr = ptr->link)
      {
            printf("%d ", ptr->data);
      }
printf("\n\n");
}

int main()
{
    printf("QUEUE IMPLEMENTATION USING LINKED LIST");
int option, item;       while(1)
      {                  printf("\n1. Insert an Element (Node) in the
Queue\n");             printf("2. Delete an Element from the
Queue\n");             printf("3. Display Element at the Front
position\n");             printf("4. Display All Elements of the
queue\n");             printf("5. Exit\n");             printf("Enter your
option:\t");             scanf("%d", &option);
switch(option)
            {
case 1:
                          printf("Enter the Element to Add in Queue:\t");
scanf("%d", &item);                          insert(item);
break;                   case 2:
                          printf("The Deleted Element fromt the Queue:\t%d\n", delete_node());
break;                   case 3:
                          printf("Element at the Front:\t%d\n", peek());
break;                   case 4:
                          display();
break;                   case 5:
                          exit(1);
default:
                          printf("Wrong option\n");
            }
      }
return 0;
}
```


input

```
QUEUE IMPLEMENTATION USING LINKED LIST
1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      1
Enter the Element to Add in Queue:      10

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      1
Enter the Element to Add in Queue:      20

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      1
Enter the Element to Add in Queue:      40

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
```


input

```
Enter the Element to Add in Queue:      40

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      2
The Deleted Element fromt the Queue:    10

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      3
Element at the Front:   20

1. Insert an Element (Node) in the Queue
2. Delete an Element from the Queue
3. Display Element at the Front position
4. Display All Elements of the queue
5. Exit
Enter your option:      4
Queue Elements (or Nodes):
20 40
```